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**Free Falling in Stratified Fluids** TRY LAM, LIONEL VINCENT, EVA KANSO, Univ of Southern California — Leaves falling in air and discs falling in water are examples of unsteady descents due to complex interaction between gravitational and aerodynamic forces. Understanding these descent modes is relevant to many branches of engineering and science such as estimating the behavior of re-entry space vehicles to studying biomechanics of seed dispersion. For regularly shaped objects falling in homogenous fluids, the motion is relatively well understood. However, less is known about how density stratification of the fluid medium affects the falling behavior. Here, we experimentally investigate the descent of discs in both pure water and in stable linearly stratified fluids for Froude numbers  $Fr \approx 1$  and Reynolds numbers  $Re$  between 1000–2000. We found that stable stratification (1) enhances the radial dispersion of the disc at landing, (2) increases the descent time, (3) decreases the inclination (or nutation) angle, and (4) decreases the fluttering amplitude while falling. We conclude by commenting on how the corresponding information can be used as a predictive model for objects free falling in stratified fluids.

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